REMARKS

File History

In the Office action of 11/24/2004, the following allowances, rejections, objections and other actions appear to have been made:

> Claims 10-17 have been withdrawn from consideration.

> Claims 1-7 and 18-20 were rejected under 35 USC §103(a) as being obvious over Joslyn et al (US 6,203,404 B1) as combined with Williams (US 6,594,542 B1 based on a PCT application published 4/9/1998).

> Claims 8-9 were rejected under 35 USC §103(a) as being obvious over Joslyn as combined with Williams above and in further view of Sandhu et al (US 6,338,667).

> The Examiner correctly noted a typo in Applicant's previous election. It should have said 1-9 and 18-20 for the claims of Group I.

Summary of Current Response

Claims 21-23 are newly added.

Arguments are presented concerning the applied art and its proposed combination.

Serial No. 10/677,785

Applicants' Overview of Outstanding Office Action

Applicant sees the outstanding Office action of 11/24/2004 ("OA") as having the following major attributes:

(1)   There is no discussion of the specifics of any claim *taken in whole*. Most notably, the Office action appears to ignore the recitations of first and second CMP tools in independent claims 1, 2 and 18. Instead, the Office action assumes that Joslyn (the primary reference) teaches everything claimed except for "batch processing" (OA page 2, last 2 lines).

(2)   No objective evidence of motivation to combine is provided which takes into account the incompatibility between the thickness-measuring and rate-predicting aspects of Williams (the secondary reference) versus the plural-slurry teachings of Joslyn . In other words each reference is not considered in whole for what it fairly teaches such that the overall teachings would be seen to motivate against combining.

In view of the above, it is respectfully submitted that a prima facie case of unpatentability has not been made out.

Incorrect Fact Finding re the Primary Joslyn Reference

Recitations of first and second CMP tools appear in independent claims 1, 2 and 18. The outstanding rejections appear to be founded on a finding of fact that Joslyn discloses plural CMP tools. In fact, Joslyn shows only one CMP apparatus 10 in Fig. 1. Joslyn implies that the same CMP apparatus is to be used for both of the different slurries, this implication being particularly strong where Joslyn teaches to use the **same pad** (col. 3, line 11) and/or the **same common set of polishing parameters** other than slurry composition (col. 3, lines 58-64). Because Joslyn states that the first and second polishings **"can"** be conducted utilizing the same common set of polishing parameters other than ... (col. 3, lines 58-59), this implies that a same CMP tool must be used. Otherwise it would be nearly impossible to assure that all polishing parameters other than slurry composition are exactly the same. The capability indicated by use of the term, **"can"** would not be enabled if the same CMP tool is not used.

Thus, a person of ordinary skill who reads Joslyn in whole, and who does not have hindsight knowledge of the disclosure made by the present application, would be motivated to use a same CMP tool rather than two or more CMP tools.

Note additionally that Joslyn does not teach how stopping points for the differing CMP slurries are determined. At col. 3, lines 15-21, Joslyn states that:

> The depicted example [of Fig. 4] shows polishing of region 30 to a point of stopping proximate outer surfaces of conductive gate lines 28, although the invention is of course not so limited. Other workpieces might be utilized and other stopping points (defined by time, layers, etc. or combinations thereof) could be used.

> [Bracketed text and underlining added.]

It would not be clear to one of ordinary skill what specific type of technique is being used to stop at a point "proximate" of the outer surfaces of items 28. Proximate is indefinite and could indicate stopping above or below and by any arbitrary distance relative to the depth of the "outer surfaces" depending on what one's definition of "proximate" is. It is not clear what Joslyn is teaching by saying that other stopping points might be defined by "layers" or by "etc." or by combinations thereof. This too is vague and indefinite. Joslyn is silent as to what method is used in Fig. 3 to stop at thickness level t_1. See col. 2, line 62-col. 3, line 4.

Incomplete and Erroneous Fact Finding re the Secondary Williams Reference

The Office action correctly notes that Williams uses the phrase, "batch process" --and coincidentally, the use of this phrase occurs in only one instance, at col. 7, line 13, where peculiarities of polishing pads is being discussed. (The peculiarities of polishing pads is a vital aspect of the Williams disclosure. More specifically, the change in polishing pad behavior over time, as the polishing pad wears against a series of workpieces, is a fundamental part of the Williams disclosure.)

The outstanding grounds of rejection erroneously indicate at page 7, second from bottom line that Williams teaches "end point detection". A search through Williams for such terminology did not show a match. The Examiner is respectfully asked to pinpoint where

Williams teaches "end point detection" as alleged. Absent that, it is clear that the grounds of rejection are founded on erroneous fact finding and should be rescinded.

In focusing on Williams' disclosure of "batch process," the Office action misses a big picture fact. Fig. 6 of Williams shows only one "polishing apparatus 200" (col. 6, lines 1 and 25). Williams is not seen to ever discuss the idea of using two or more CMP tools. Thus the proposed combination of Joslyn and Williams would fail to provide two or more CMP tools. Accordingly, even if it were arguendo permissible to combine Joslyn and Williams, a prima facie case of obviousness is not presented.

To be fair, Williams does use the plural form, "CMP tools." However Williams' choice to use the plural form in the Background section does not teach successively using separate CMP tools each using a different slurry. Indicative of this is Williams' explanation at col. 1, lines 64-66: "Polishing continues through until time (t_{final}) when the wafer is removed from the tool, cleaned, and measured afterwards to confirm that an acceptable final thickness (t_{final}) was achieved." [underlining added] Thus it is seen that Williams contemplates a single CMP tool with time-based determination of the stopping point.

More importantly, Williams teaches a prediction algorithm for predicting the effects of wear down of the polishing pad (see col. 4, lines 13-16) and from this, defining an "adjusted polishing time" (col. 4, lines 58-61) that is different than the initial setting of the polish-end-time. The adjusted polishing time is used for the next wafer to be polished (col. 9, lines 6-15) in a series of wafers polished by the same pad and under substantially same other parameters.

Williams does not teach or suggest a prediction algorithm that can be used for predicting the effects of wear down of the polishing pad when different slurries are used. Thus, the proposed combination of Joslyn and Williams is not enabled. Moreover, the proposed combination of Joslyn and Williams goes against the teachings of Williams that the other factors beyond wear down on the polishing pad should remain substantially unchanged. It is impermissible to combine references that teach away from one another.

Failure to address the specifics of each claim

The Office action summarily rejects all of claims 1-7 and 18-20 based on the proposed combination of Joslyn and Williams as detailed above. However, the outstanding grounds of

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rejection fail to account for details of the specific claims. Claim 2 recites "(d) using end-point detection". <u>Williams</u> clearly teaches away from this by calling for an adjustment to the time-based stopping of the polishing process.

Claim 4 defines the combination of "(e) using time measurement in the first CMP tool" and, through its dependence from Claim 2, "(d) using end-point detection in the second CMP tool". The applied art simply fails to suggest this combination of using two different stopping methods in first and second CMP tools.

Claim 5 recites "(e) shortening a time limit ... in response to an indication that ... the first CMP tool is being requested for another batch of workpieces." The applied art simply fails to suggest this advantage of the multi-tool approach whereby scheduling flexibility is created for at least the first CMP tool due to the fact that it is not required to polish down to a specific depth.

Claim 6 recites "(e) automatically adjusting polishing pressure in said first CMP tool in response to an indication that workpieces in said supplied first batch are to be only partly-polished." The applied art simply fails to suggest the provision of a signal to a CMP tool that a supplied batch is to be only partly-polished, let alone that the tool should respond by automatically adjusting polishing pressure. In similar vein, Claim 7 recites "(e) automatically adjusting velocity of a polishing pad". In similar vein, Claim 8 recites "(e) automatically adjusting feed rate of a slurry used by said first CMP tool". In similar vein, Claim 9 recites "(e) automatically changing between use in said first CMP tool of a first slurry of respective first quality and a second slurry of respective second and different quality in response to an indication that workpieces in said supplied first batch are to be only partly-polished." No reasons are provided in the outstanding grounds of rejection for how or why an ordinary artisan would be led to any of this after having read <u>Joslyn</u> and <u>Williams</u> alone, or per the proposed combination. It is well established that a prima facie case of obviousness is not made out when the rejection fails to provide "reasons". See 35 USC §132(a).

With regard to Claims 8-9 as mentioned immediately above, the outstanding grounds of rejection propose to add Sandhu '667, arguing that this would somehow improve throughput. The alleged improvement of throughput is mere speculation. There is no objective basis of fact for concluding that throughput would be improved by the proposed combination. Moreover, there is no explanation of how an ordinary artisan would be motivated to expect

successful increase of throughput by attempting to combine the away teachings of these various references.

Fig. 1 of Sandhu '667 shows only a single chemical mechanical a planarization (CMP) apparatus 10. The apparatus 10 has a laser source and holes for optically detecting an end point. This is incompatible with the time-based stopping method of Williams. The single CMP apparatus taught by Sandhu does not remedy the failure of Joslyn and Williams to teach or suggest plural CMP tools. Moreover, Sandhu fails to teach or suggest the provision of a signal to a CMP tool that a supplied batch is to be only partly-polished, let alone that the tool should respond to it.

CONCLUSION

In light of the foregoing, Applicant respectfully requests that the rejections be withdrawn and the claims allowed. Should any other action be contemplated by the Examiner, it is respectfully requested that he contacts the undersigned at (408) 392-9250 to discuss the application.

The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 50-2257 for any matter in connection with this response, including any fee for extension of time and/or fee for additional claims, which may be required.

Respectfully submitted,

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